Remote sensing and GIS for the study of petroleum-bearing basins: Example from Timan-Pechorian petroleum province

SMIRNOVA, I.O., ROUSANOVA, A.A., Institute of Remote Sensing Methods for Geology, St.Petersburg, Russia

Integrated analysis of remotely sensed and geoscience data based on GIS-technology has been made at the northern part of Timan-Pechorian petroleum province. The tectonic criteria of petroleum zones and traps distribution, the causes of their formation and the regularities of their reflection on remotely sensed data were studied. As a result the Knowledge Base and Data Base have been created for study area.

Data Base includes multispectral and radar data from Russian satellites and Japanese satellite JERS-1, landscape, topographic, geologic, geophysic data, the results of satellite data processing, schemes of their interpretation, schemes of geoindicators of geological structures and etc.

The regional regularities of petroleum traps distribution were revealed and studied using remote sensing. These are as follow: arrangement of petroleum traps and fields into the chains along the north-west-trending and north-east-trending lineaments and knots of their crossing, coincedence between distribution of petroleum fields of different age and neotectonic movements intensity, distribution of glacial landforms and boundaries of ancient glacial sheets. Using these conclusions the sheme of tectonic zonation was composed and petroleum prospective sites were revealed.

Tectonic conditions within single petroleum fields were investigated using the analysis of landscape features (lineaments, lakes, drainage, bogs). It has allowed to study block structure of the area, to reveal fracture and fault zones and the sites with different petroleum prospects.